



**INFLUENCE OF VEGETATION
ON FLOODS Hydrology & Hydraulics**

Typical 'hypothesised' expectations

- Trees across catchment absorb more rain
less runoff – reduced total flood volume
- Trees along waterways slow flow – increase reach storage
reduced flood peak – delayed flood peak {storage effects}

Using evidence to assess hypothesis

- Trees across catchment absorb more rain
less runoff – reduced total flood volume
Assess recorded rainfall and estimate of runoff volume from recorded levels and perhaps use hydrology model
- Trees along waterways slow flow – increase reach storage
reduced flood peak – delayed flood peak {storage effects}
Assess with hydraulic model – modify flow resistance parameters to represent trees

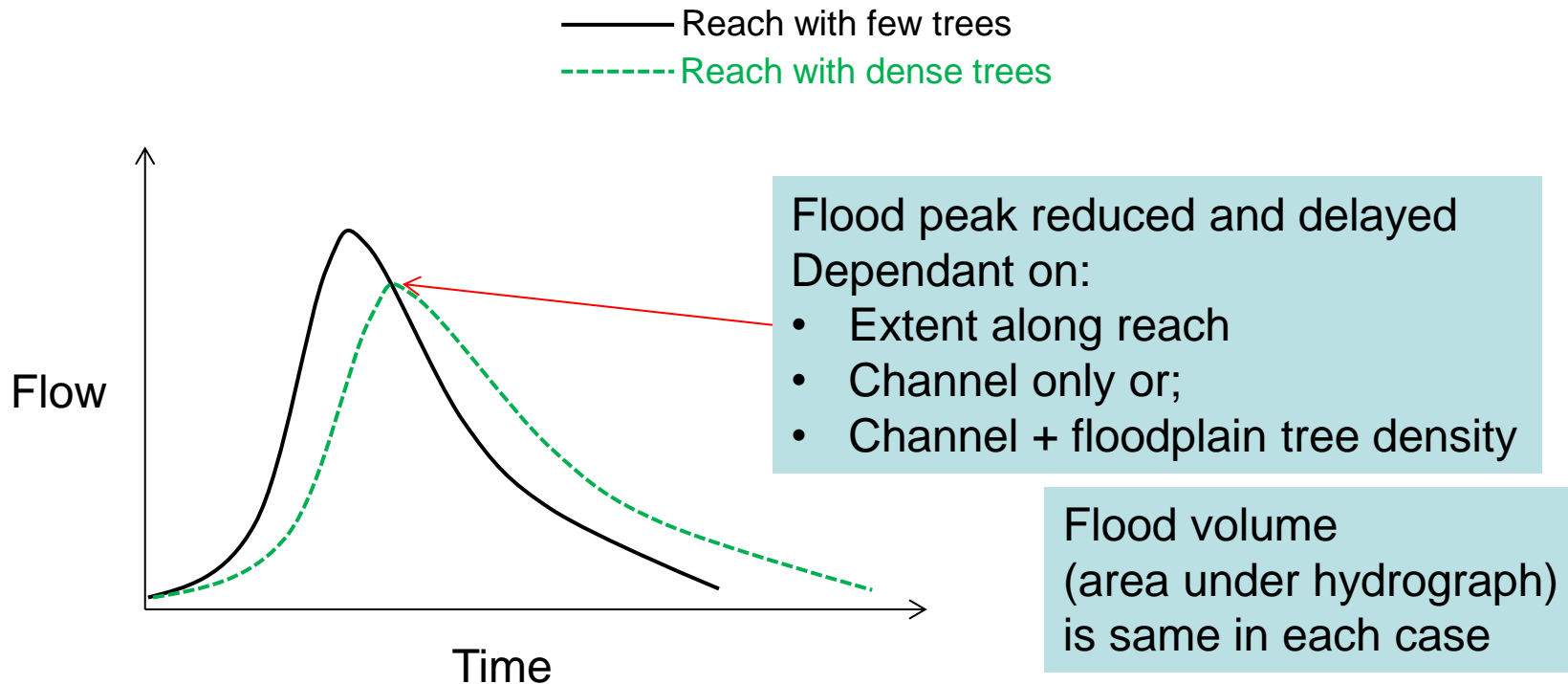
Effect on runoff Ex TC Oswald – Jan 2013

- Event preceded by long period hot dry weather
effectively very dry catchments across entire SEQ region
- Compare losses from hydrology calibration & runoff from data

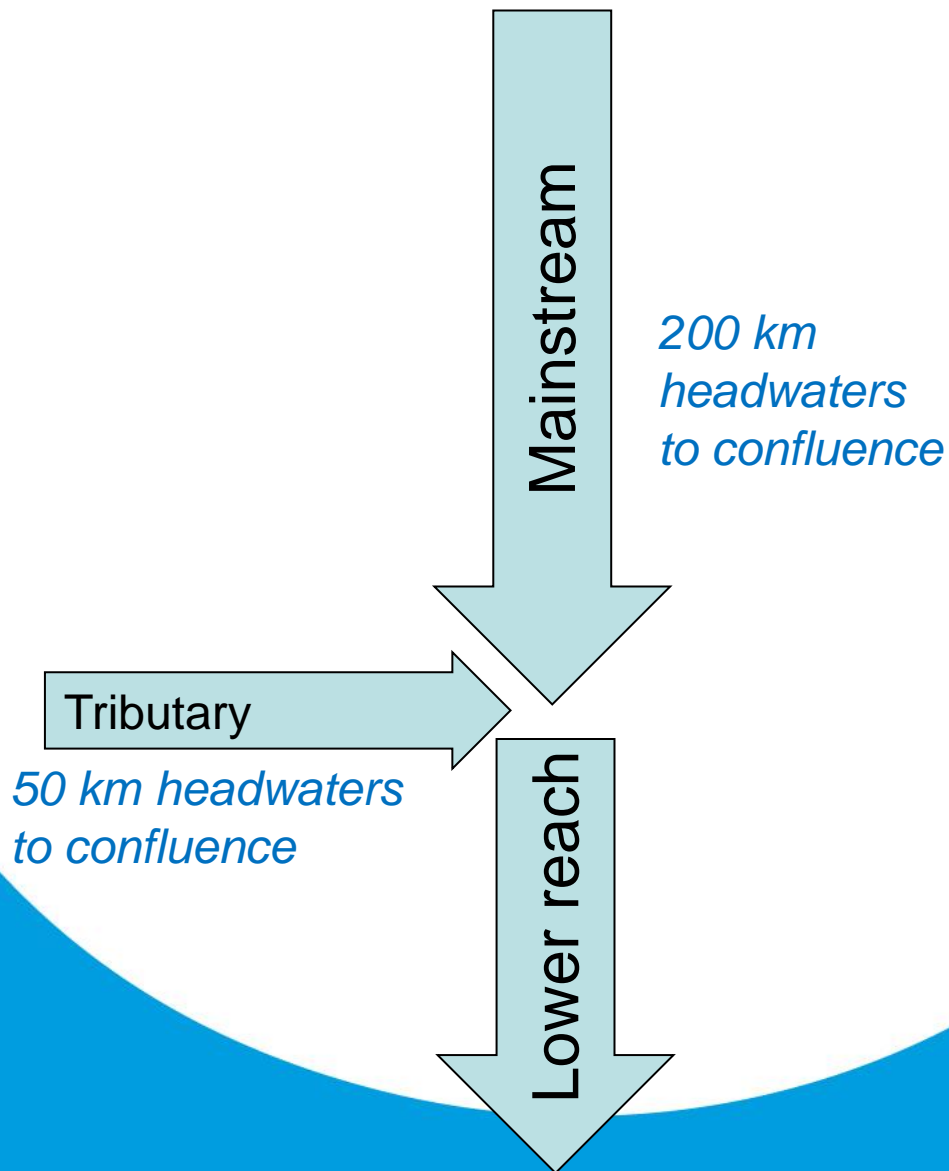
Parameter	Lake Macdonald Six Mile creek	Wappa Dam South Maroochy	Enoggera Dam	Hinze Dam
Catchment area	46 km ²	71 km ²	32 km ²	207 km ²
% Forest cover	~ 15%	~ 30%	100%	~ 90%
Event Rainfall	559 mm	630 mm	555 mm	867mm
Calibration NSE	0.99	0.95	0.98	0.90
Calibration Initial & continuing loss	190 mm 2.5 mm/h	145 mm 2.5 mm/h	125 mm 1.5 mm /h	65mm 2.0 mm/h
Observed runoff	242mm	443 mm	442 mm	635 mm
Runoff % of rain	43%	70%	80%	73%

Trees to reduce flood volume ? – unconvincing for this large rainfall event with intense rainfall

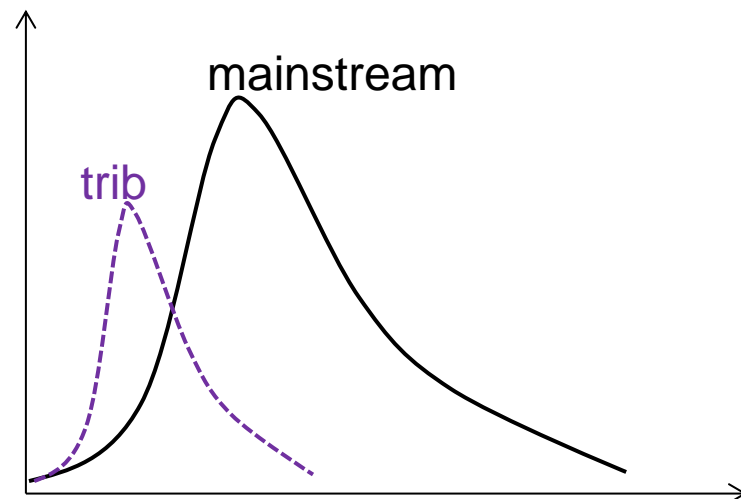
Effect on flow hydrograph downstream of revegetated reach that can be modelled



Caution for risk unintended adverse impacts from ad-hoc approach across catchment

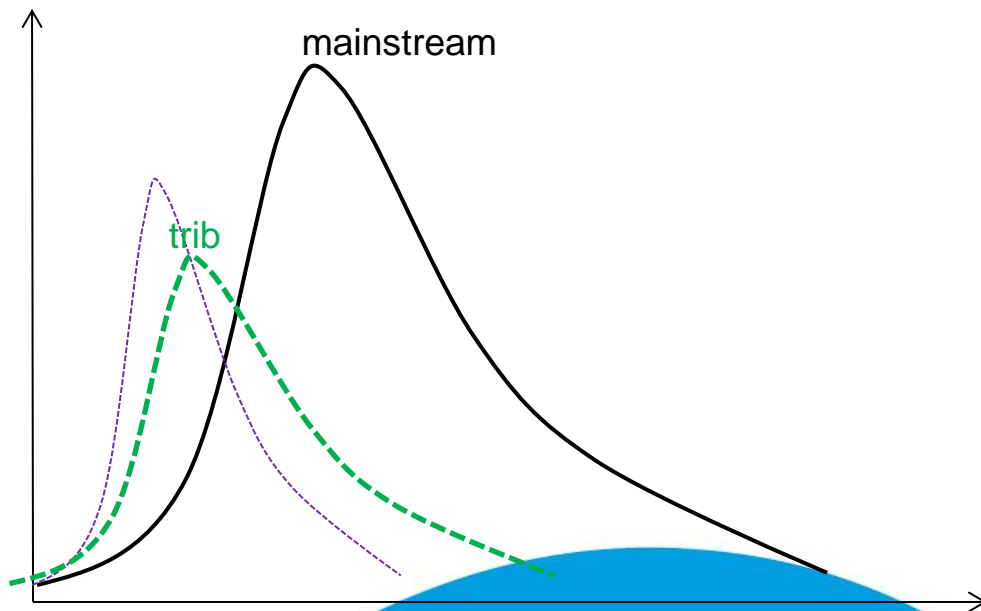
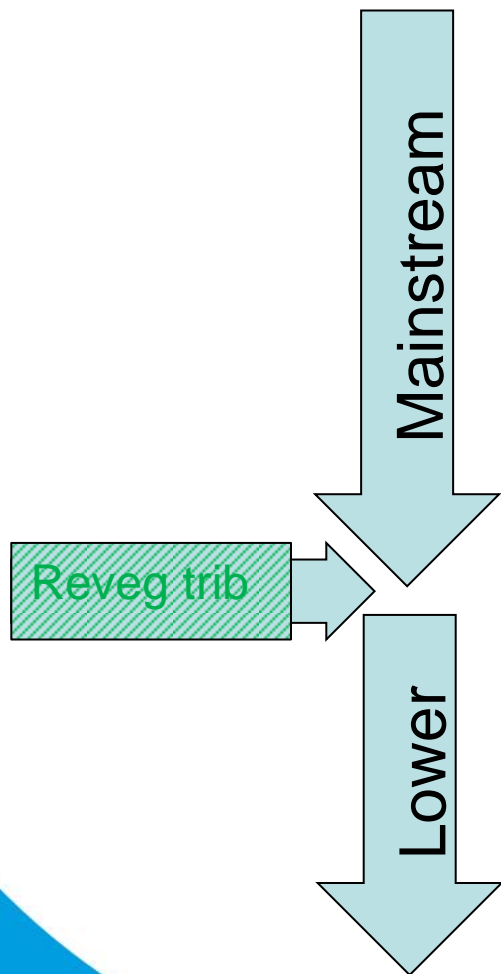


Mainstream flood to confluence typically arrives later than flood hydrograph from tributary



Caution for risk unintended adverse impacts from ad-hoc approach across catchment

More trees on a tributary could delay tributary flow. If there is no change to mainstream waterway, this may increase coincident flows at the peak of the mainstream flood
Potential for increased peak flow downstream !



Whole of catchment approach is important to strategically target where revegetation occurs

Summary

- Trees across catchment to reduce flood runoff:
 - May be more effective for small common rain events
 - Diminishing benefit in larger more rare rain events
when rainfall far exceeds what catchment can absorb
- Trees along waterways to slow down floods (attenuation due to increased “reach storage”):
 - Can be assessed with hydrodynamic modelling
 - Ad hoc approach may produce unintended impacts
 - Strategic whole of catchment approach is important
- Trees can provide many other benefits – don’t ignore the opportunity